REMARKS/ARGUMENTS

Status of Claims

In an Office Action dated March 24, 2009, claims 22-24 and 27-28 were pending in the application. All of the claims were rejected.

No claim is amended. No claims are canceled or added. Therefore, claims 22-24 and 27-28 are present for examination. Withdrawal of the rejections is respectfully requested in view of the following remarks.

35 U.S.C. §103 Rejections

Claims 22-24 and 27 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,788,778 issued to Shang et al. ("Shang") in view of U.S. Patent No. 5,018,479 issued to Markunas et al. ("Markunas").

Claim 28 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Shang and Markunas. The rejections are respectfully traversed.

The Office Action asserts that Shang teaches a method of removing residue from a substrate processing chamber, forming a plasma remotely (46, Col. 4, ll. 40-53) and forming a nonplasma diluent gas flow (32,34, Col. 4, ll. 23-31). However, gas supply 32 contains the gases that are used during **deposition** (column 4, lines 21-22). Other gas supplies include a source of precursor gas 44 (column 4, line 41) and gas 52. Gases 44 and 52 are used to **clean** the inside of the chamber after a sequence of deposition runs (column 4, lines 31-36). Because gas 32 is used **during** deposition and gas 44 is used **after** deposition, gas 32 (nonplasma diluent gas) is **not mixed** with the plasma including a plurality of reactive radicals (gas 44). Therefore, Shang fails to teach or suggest "**mixing** said flow of said reactive radicals and said diluent gas flow", as recited in claim 1.

Gas 52 is described as a "minor carrier gas" (column 4, lines 64-65). The minor carrier gas may be "argon, nitrogen, helium, hydrogen or oxygen." (column 5, lines 4-5). Gases 44 and 52 are used to **clean** the inside of the chamber after a sequence of deposition runs (column 4, lines 31-36). The minor carrier gas is introduced to the remote chamber 46, and **not**

mixed with the plurality of reactive radicals **at a location** downstream of a location of forming said flow of said reactive radicals and anterior to said chamber to form a gas-radical mixture. Thus, Shang fails to teach or suggest "**mixing** said flow of said reactive radicals and said diluent gas flow **at a mixing location** downstream of a location of forming said flow of said reactive radicals and anterior to said chamber to form a gas-radical mixture", as recited in claim 1.

The Examiner also states that Markunas teaches a similar remote plasma apparatus (Fig. 2, Col. 6, ll. 8-48) including a plasma feed 14 and a hydrogen "carrier gas" 18_1. However, Markunas describes that the hydrogen "carrier gas" is used **for deposition** in the remote plasma apparatus, but **not for removing** residue from a substrate processing chamber. Because of the purpose for deposition rather than cleaning, Markunas shows, in Fig. 2 and Col. 4, ll. 45-49, that the carrier gas inlet 18 is inside the chamber 20_1 such that **mixing** occurs in the interaction region 20 **inside** the chamber 20_1. Therefore, Markunas does not teach or suggest **mixing** said flow of said reactive radicals and said diluent gas flow **at a mixing location** downstream of a location of forming said flow of said reactive radicals and **anterior to** said chamber to form a gas-radical mixture.

For the purpose of cleaning, Markunas describes an **in-situ** hydrogen cleaning method (Col. 13, ll. 24-Col. 14, ll. 26). Such a cleaning method uses dissociation of molecular hydrogen in the plasma region and transport **atomic hydrogen** to the substrate surface (Col. 13, ll. 33-38). The hydrogen reacts with residual carbon and oxygen atoms forming volatile compounds which leave the surface. Therefore, Marknas does not teach or suggest "**mixing** said flow of said reactive radicals and said diluent gas flow", as recited in claim 1.

For at least these reasons, claim 1 is believed to be patentable over Shang in view of Markunas. Each of the dependent claims is believed to be patentable by virtue of their dependence from an allowable base claim.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,

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